

## **EXHIBIT 11**

**IN THE UNITED STATES DISTRICT COURT  
FOR THE WESTERN DISTRICT OF TEXAS  
WACO DIVISION**

WSOU INVESTMENTS, LLC, d/b/a  
BRAZOS LICENSING AND  
DEVELOPMENT,

Plaintiff,

v.

HEWLETT PACKARD ENTERPRISE  
COMPANY,

Defendant.

Civil Action No. 6:20-cv-00725-ADA  
Civil Action No. 6:20-cv-00726-ADA  
Civil Action No. 6:20-cv-00727-ADA  
Civil Action No. 6:20-cv-00728-ADA

**Declaration of Paul S. Min, Ph.D., in Response to  
Dr. Scott Nettles' Declaration Dated March 1, 2021**

I, Paul S. Min, Ph.D. declare as follows:

**I. INTRODUCTION**

1. My name is Paul S. Min, Ph.D. I am currently a Senior Professor in the Preston M. Green Department of Electrical and Systems Engineering at Washington University in St. Louis.

2. I have been asked by counsel for Hewlett Packard Enterprise Company (“HPE” or “Defendant”) to provide my opinion regarding a certain claim term recited in the claims of U.S. Patent No. 7,519,056 Managing Traffic in a Multiport Network Node Using Logical Ports (“the ’056 Patent”) to Ishwar, et al.

3. In particular, I have been asked to review the Declaration of Scott Nettles, Ph.D. (“Nettles Declaration”), which was submitted by Dr. Scott Nettles on behalf of the plaintiff WSOU Investments, LLC d/b/a Brazos Licensing and Development (“Brazos” or “Plaintiff”) on March 1, 2021, and respond to the opinions stated therein as necessary.

4. I am being compensated by HPE for my work on this litigation at my standard consulting rate of \$450 per hour. I am also being reimbursed for any reasonably incurred expenses. No part of my compensation is contingent upon the outcome of this litigation. I have no other interests in this litigation or with any of the parties.

5. I am competent to testify to the matters stated in this declaration, have personal knowledge of the facts and statements herein, and each of the statements is true and correct to my knowledge.

## **II. QUALIFICATIONS**

6. I am an expert in the field of communication and computing. I joined Washington University in St. Louis as an Assistant Professor in 1990 in the Department of Electrical and Systems Engineering. I am currently a Senior Professor.

7. Before joining Washington University, I spent three years at Bellcore (now Telcordia Technologies, Inc.), where I was a lead systems engineer for the Bell Operating Companies assisting in the transition from their voice centric networks at the time of the AT&T divesture into multi-services capable networks suited for the Internet era. I received an Outstanding Achievement Award for my contributions to Bellcore in 1989. Upon arriving at Washington University, I developed a communication and computer curricula in the School of Engineering and Applied Science. A complete list of my publications, professional activities, and honors that I have received is fully set forth in my curriculum vitae, attached hereto as Appendix A.

8. I received a bachelors degree, masters degree, and doctorate degree in Electrical Engineering from the University of Michigan in 1982, 1984, and 1987,

respectively. I received several academic honors, including my B.S. degree with honors, a best graduate student award and a best teaching assistant award during my M.S. study, and a best paper award from a major international conference for reporting results from my Ph.D. thesis.

9. From 2011 to 2014, I served as the Chair of the Undergraduate Curriculum, and from 2000 to 2002, I served as the Chair of the Graduate Curriculum in the Department of Electrical and Systems Engineering at Washington University.

10. I have collaborated and consulted with numerous companies and organizations around the world and served as an advisor for several national governments. I also founded and managed two start-up companies, MinMax Technologies and Erlang Technology, related to communication and computing systems during 1997-2008. One of the commercial products we developed received a best product award from a major Internet trade journal in 2002.

11. I have received multiple awards for my publications and contributions to the communication and computing technologies. In 1988, I received the Best Paper Award at 18th ISATA Award of Technical Excellence in Florence, Italy. I was also a Rockwell Fellow at the University of Michigan in Ann Arbor in 1988 and 1989. I received a Research Initiation Award in 1993 from the Defense

Advance Research Project Agency (“DARPA”). I received the Best Paper Award at MOBILITY 2011 in Barcelona, Spain.

12. I was a member of the Presidential Business Advisors Committee (to President George W. Bush) and was named 2002 Businessman of the Year by the Wall Street Journal for the State of Missouri, for my entrepreneurial efforts. I have also served as an Ambassador for the McDonnell International Scholars Academy (2007-2013).

13. In 2014, I served as the Chair of the Saint Louis Section of the IEEE with more than 3,000 members. I have also served as a member of the Executive Committee and the Chair of the Communication Society for the Saint Louis Section of the IEEE for a number of years. I have also been an organizer for several international symposiums, a guest editor of international journals, and have given a number of invited presentations.

14. I am a listed inventor on eleven U.S. patents related to communication and computing technologies. I have authored and co-authored about 200 technical papers, about 100 of which have appeared in various peer-reviewed journals and conferences.

15. Additional details of my education and work experience, awards and honors, and publications that may be relevant to the opinions I have formed are set forth in my curriculum vitae.

### **III. MATERIAL CONSIDERED**

16. As part of my preparation for writing this declaration, I reviewed and relied on the materials listed in Appendix B.

### **IV. UNDERSTANDING THE LAW**

17. I am not a lawyer, and I do not intend to offer any opinions as to the interpretation of the law. However, I have a general understanding of claim construction based on my experience with patents, my work as an expert in other cases, and my conversations with counsel. I have been informed by counsel of various legal standards related to claim construction and indefiniteness. I set forth my understanding below.

#### **A. Person of Ordinary Skill in the Art**

18. I understand that claim construction and indefiniteness are both analyzed from the perspective of a person having ordinary skill in the art. I understand that the person of ordinary skill in the art is a hypothetical person of ordinary creativity, not an automaton. I understand that a person of ordinary skill, while not someone who undertakes to innovate, is capable of drawing inferences and taking creative steps. I understand that, in determining the level of skill in the art, courts consider the type of problems encountered in the art, prior art solutions to those problems, rapidity with which innovations are made, sophistication of the

technology, and the educational level of active workers in the field. I understand that not all of these factors will be relevant in a given case.

**B. Patent Claims and Claim Construction**

19. I understand that a patent may include two types of claims, independent claims and dependent claims, that an independent claim stands alone and includes only the limitations it recites, that a dependent claim can depend from an independent claim or another dependent claim, and that a dependent claim includes all the limitations that it recites in addition to all of the limitations recited in the claim from which it depends.

20. I understand that the words of a claim are generally given their ordinary and customary meaning that the terms would have to a person of ordinary skill in the art in question at the time of the invention. I understand that the person of ordinary skill in the art is deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification.

**C. Indefiniteness**

21. I understand that 35 U.S.C. § 112, ¶ 2 requires patent claims to be definite, meaning a claim should “particularly point[] out and distinctly claim[] the subject matter that the applicant regards as the invention.” I understand that indefiniteness is to be evaluated from the perspective of someone skilled in the

relevant art at the time the patent was filed. I understand that, in assessing indefiniteness, claims are to be read in light of the patent's specification and prosecution history. I understand that the definiteness requirement of § 112, ¶ 2 requires that a patent's claims, viewed in light of the specification and prosecution history, inform those skilled in the art about the scope of the invention with reasonable certainty. I understand that the claims, when read in light of the specification and the prosecution history, must provide objective boundaries for those of skill in the art. I understand, when a claim term is subjective or directed to a term of degree (e.g., "greater than"), courts look to the written description of the patent to determine whether it provides guidance.

22. I understand that the factors considered in determining the ordinary level of skill in a field of art include the level of education and experience of persons working in the field; the types of problems encountered in the field; and the sophistication of the technology at the time of the claimed invention, which I understand is either June 4, 2002 or June 4, 2003 for the '056 Patent, depending on whether it is entitled to the provisional application filing date. My opinions in this declaration would be the same regardless of which of these two dates is used. I understand that a person of ordinary skill in the art is a hypothetical individual having the qualities reflected by the factors above. I understand that a person of

ordinary skill in the art would also have knowledge of the teachings of the prior art.

23. I am informed that the specification of a patent must satisfy a definiteness requirement, which requires that it conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as the invention.

24. I am also informed that definiteness requires that a patent's claims, viewed in light of the specification and file history from the perspective of a person skilled in the relevant art at the time the patent was filed, inform those of ordinary skill in the art about the scope of the invention with reasonable certainty.

25. I understand that a patent must be precise enough to afford clear notice of what is claimed and apprise the public of what is still open to them in a manner that avoids a zone of uncertainty which enterprise and experimentation may enter only at the risk of infringement claims.

26. I have followed the above-stated guidelines for the law in providing my opinions in this declaration.

## **V. The '056 Patent**

27. The '056 Patent is entitled, "Managing Traffic in a Multiport Network Node Using Logical Ports. The '056 Patent states that "[a] technique for implementing VLANs across a service provider network involves establishing

logical ports that have bindings to transport tunnels. The logical ports are then treated the same as physical ports in defining broadcast domains at particular service provider edge devices.” (’056 Patent, Abstract.) The ’056 Patent further states that “[i]n one embodiment, the logical port is bound to a static MPLS tunnel and in another embodiment, the logical port is bound to a dynamic MPLS tunnel and the destination IP address of the destination service provider edge device.” (’056 Patent, Abstract.)

28. The following is a figure from the ’056 Patent, which “depicts an example of a dynamic MPLS tunnel that connects physical port  $P_3$  of SPED A to physical port  $P_4$  of SPED B.” (’056 Patent, 4:19-21.)

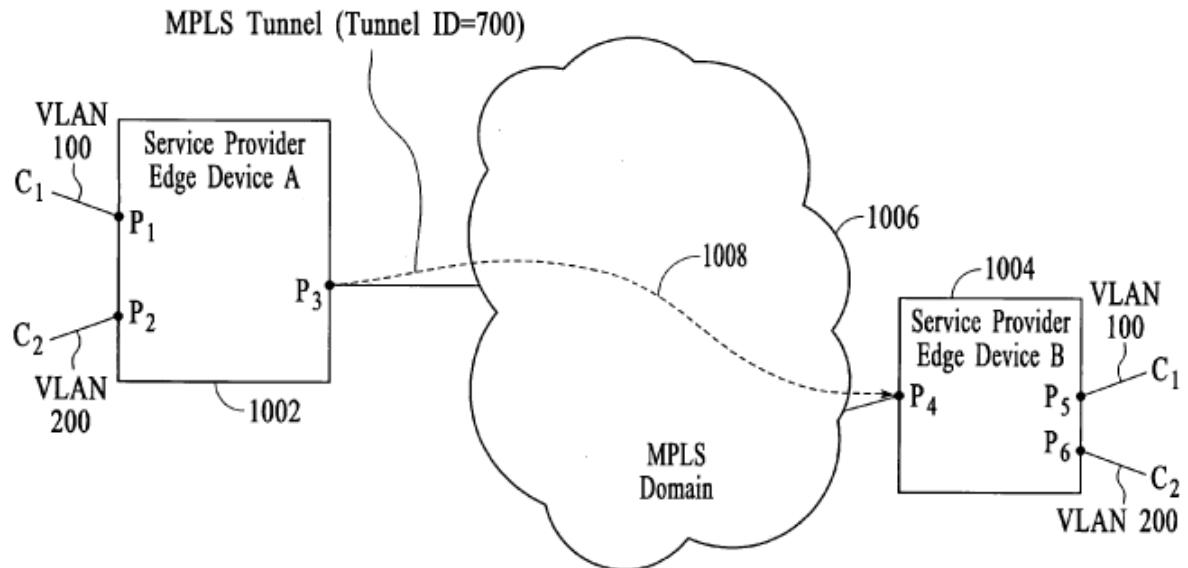


FIG. 10

(’056 Patent, FIG. 10.)

29. With regard to FIG. 10 above, the '056 Patent states that “a logical port, identified as ‘LP<sub>MPLS.5000</sub>’, is bound to MPLS tunnel 700 and to the destination IP address of SPED B. The subscript number ‘5000’ is a number that is selected by SPED A to identify the logical port.” ('056 Patent, 9:20-24.) The '056 Patent further states that “[i]n operation, the MPLS tunnel ID is used to identify the actual LSP on which a packet travels. Likewise, the LSP on which the packet travels may be mapped to a physical port of the SPED (which acts as the ingress label edge router). The actual LSP that corresponds to the MPLS tunnel is dynamically determined by an LDP.” ('056 Patent, 9:27-32.)

## **VI. CLAIM TERM “DYNAMICALLY DETERMINED”**

30. The claim term “dynamically determined” is recited in claims 1, 18, and 21 of the '056 Patent.

31. For reference, I have reproduced claim 1 of the '056 Patent below.

A method for managing virtual local area network (VLAN) traffic in a network node comprising:

establishing a logical port within a network node that includes a binding to a tunnel;

associating said logical port with a VLAN;

receiving traffic at said network node that is associated with said VLAN;

forwarding said traffic out of said network node using said logical port;

wherein establishing said logical port includes binding said logical port to a dynamic multi-protocol label switched (MPLS) tunnel and a destination IP address and wherein the dynamic MPLS tunnel is an MPLS tunnel that does not specify a particular label switch path (LSP) that is to be used to reach a target destination and wherein the LSP that corresponds to the MPLS tunnel is dynamically determined by a label distribution protocol (LDP); and

wherein said logical port includes a binding to a virtual circuit (VC) identifier (ID) that is to be used for a VC label in a layer 2 MPLS label stack.

## **VII. PERSON OF ORDINARY SKILL IN THE ART**

32. The Nettles Declaration states that “a person of ordinary skill in the art would be represented by a person with a computer science, electrical engineering, or computer engineering degree and two or more years of professional experience designing and implementing computer networks and/or computer network software.” (Nettles Declaration, paragraph 16.)

33. While I agree with Dr. Nettles’ opinion regarding the fields (i.e., computer science, electrical engineering, or computer engineering), I find his opinion unclear as to what level of degree is required. In my opinion, the degree should be at the Bachelors level. In addition, I disagree that the computer network software alone may provide sufficient relevant experience for the subject matter discussed in the ’056 Patent. This is because the ’056 Patent is related to the establish VLANs across the MPLS domain, wherein the speed of packets traversing cannot be supported by the software operation. A person of ordinary skill in the art must have networking hardware experience for the implementation of VLAN packets tunneling through the MPLS domain.

34. In my opinion, a person of ordinary skill in the art would have had a minimum of a Bachelors degree in electrical engineering, computer engineering, computer science, or closely related fields with two or more years of experience in

computer networking. I based my opinion on my own professional experience, my understanding of those who practices the technical subject of the '056 Patent, and the experience levels of the workers in the field, many of whom I hired in my own companies.

### **VIII. MY RESPONSES TO THE NETTLES DECLARATION**

35. The '056 Patent states that “[a]nother technique that is used to tunnel traffic through an intermediate network involves the use of multiprotocol label switching (MPLS). Using MPLS, incoming packets are assigned a ‘label’ by a ‘label edge router.’ Packets are forwarded along a ‘label switch path’ (LSP) through a series of connected ‘label switch routers.’ (’056 Patent, 7:3-8.)

36. In order to address whether or not the claim term “dynamically determined” recited in claims 1, 18, and 21 of the '056 Patent is indefinite, a key question at hand is how the Label Distribution Protocol (“LDP”) determines a particular LSP to be used to reach a target destination. As I will explain below, in my opinion, the claim term “dynamically determined” is vague and confusing and does not define the scope of claims 1, 18, and 21 and as such, it is indefinite.

37. A standard document entitled, “LDP Specification,” which is known as the Request for Comments 5036 (“RFC 5036”), was published by the Internet Engineering Task Force Network Working Group in October 2007. It replaces an earlier version of the LDP Specification, RFC 3036, which was published in

January 2001. (RFC 5036, 5). These two versions span the time of alleged invention in the '056 Patent, and so they help to illustrate what a person of ordinary skill in the art would have known and considered in that time frame. Moreover, RFC 5036 includes a “Changes from RFC 3036” section that shows none of the disclosure relied upon in this declaration changed between the publication of RFC 3036 and RFC 5036. (*See* RFC 5036, 90-93).

38. The '056 Patent cites to and incorporates by reference two IETF documents. '056 patent at 7:43–47 (incorporating by reference draft-martini-12circuit-encap-mpls-09.txt and draft-martini-12circuit-encap-mpls-04). Neither of these IETF documents discuss the term “dynamically,” but draft-martini-12circuit-encap-mpls-09 cites to RFC 3036.

39. RFC 5036 states that “[t]he architecture for Multiprotocol Label Switching (MPLS) is described in RFC 3031. A fundamental concept in MPLS is that two Label Switching Routers (LSRs) must agree on the meaning of the labels used to forward traffic between and through them. This common understanding is achieved by using a set of procedures, called a label distribution protocol, by which one LSR informs another of label bindings it has made. This document defines a set of such procedures called LDP (for Label Distribution Protocol) by which LSRs distribute labels to support MPLS forwarding along normally routed paths.” (RFC 5036, Abstract); (RFC 3036, Abstract).

40. I note that while RFC 5036 extensively discusses various rules and procedures for establishing and maintaining the LSPs, it does not use the term “dynamically.” To the extent that RFC 5036 discusses any change in the LSP, it states that “[n]ote that whether an LSR is an egress for a given FEC may change over time, depending on the state of the network and LSR configuration settings.” (RFC 5036, page 21); (RFC 3036, page 22.) The term “FEC,” which stands for “forward equivalent class,” assigns for each stream of packets the quality of service (“QoS”) required. One of ordinary skill in the art would have understood that based on this excerpt from RFC 5036, the state of the network (e.g., congestion, delay) and the LSR configuration setting can change the FEC and as such, if a packet stream requires a certain QoS, there may have to be certain changes in the LSP assigned to the MPLS.

41. This understanding is consistent with the '056 Patent, which states that “LSPs can be established by network operators for a variety of purposes, such as to guarantee a certain level of performance, to route around network congestion, or to create tunnels for virtual private networks. MPLS can be used to create end-to-end circuits, with specific performance characteristics, across any type of transport medium.” ('056 Patent, 7:14-19.)

42. Of particular note, RFC 5036 does not dictate that an MPLS tunnel must use a different LSP upon detection of congestion or delay. According to RFC

5036, a congestion or delay in the MPLS domain can be remedied by, for example, expanding the resource reserved on the same LSP instead. While the LSP with the same identifier is used, one of ordinary skill in the art would not have known whether the same LSP, after the additional resource has been allocated, would constitute the “dynamically determined” LSP by the LDP since it is LDP, through exchanging various messages, that results in the QoS characteristics of the LSP.

43. RFC 5036 states that “[t]he main advantage of the conservative mode is that only the labels that are required for the forwarding of data are allocated and maintained. This is particularly important in LSRs where the label space is inherently limited, such as in an ATM switch. A disadvantage of the conservative mode is that if routing changes the next hop for a given destination, a new label must be obtained from the new next hop before labeled packets can be forwarded.” (RFC 5036, page 21); (RFC 3036, page 22.) RFC 5036 further states that “[t]he main advantage of the liberal label retention mode is that reaction to routing changes can be quick because labels already exist. The main disadvantage of the liberal mode is that unneeded label mappings are distributed and maintained.” (RFC 5036, page 22); (RFC 3036, page 23.)

44. RFC 5036 states that “[t]he MPLS architecture discusses some of the considerations when choosing a label distribution protocol for use in particular MPLS applications such as Traffic Engineering [RFC2702].” (RFC 5036, page 5);

(RFC 3036, page 5.) RFC 5036 explains the "traffic engineering" application as LSRa (i.e., the ingress LSR) sends traffic matching some criteria via an LSP to non-directly connected LSRb (i.e., the egress LSR) rather than forwarding the traffic along its normally routed path. (RFC 5036, page 10); (RFC 3036, page 11.) One of ordinary skill in the art would have understood that the aforementioned "some criteria" may be the QoS criteria required by the stream of packets transported via the MPLS network.

45. In order to understand how an LSP is selected based on the "some criteria," I refer to a standard document entitled "Requirements for Traffic Engineering Over MPLS," which is known as RFC 2702 ("RFC 2702"). RFC 2702 is published by the Internet Engineering Task Force Network Working Group in September 1999. As discussed above, RFC 2702 is cited for providing a discussion of label distribution protocols by RFC 5036 (and RFC 3036). (RFC 5036, page 5); (RFC 3036, page 5).

46. RFC 2702 states that "Traffic Engineering (TE) is concerned with performance optimization of operational networks. In general, it encompasses the application of technology and scientific principles to the measurement, modeling, characterization, and control of Internet traffic, and the application of such knowledge and techniques to achieve specific performance objectives." (RFC 2702, page 4.)

47. RFC 2702 states that “[t]he attributes associated with traffic trunks and resources, as well as parameters associated with routing, collectively represent the control variables which can be modified either through administrative action or through automated agents to drive the network to a desired state. In an operational network, it is highly desirable that these attributes can be dynamically modified online by an operator without adversely disrupting network operations.” (RFC 2702, page 10.)

48. RFC 2702 states that “[p]ath management concerns all aspects pertaining to the maintenance of paths traversed by traffic trunks. In some operational contexts, it is desirable that an MPLS implementation can dynamically reconfigure itself, to adapt to some notion of change in ‘system state.’ Adaptivity and resilience are aspects of dynamic path management.” (RFC 2702, page 14.) Notably, RFC 2702 does not state that an LSP is dynamically determined by the LDP, as required by claims 1, 18, 21 of the '056 Patent. Instead, the traffic engineering aspect of the MPLS network needs to address the dynamic path management.

49. RFC 2702 lists a number of different dynamic path management methods in Sections 5.6.1-5.6.5 on pages 15-18. Among these methods, significant differences exist. The Administratively Specified Explicit Paths (Section 5.6.1) specifies explicit path for a traffic trunk by operator action, which specifies path

completely or partially (and thus may change over time) The Hierarchy of Preference Rules for Multi-Paths (Section 5.6.2) allows a set of candidate explicit paths for a given traffic trunk together with a defined hierarchy of preference relations on the paths, which under failure scenarios the preference rules are applied to select an alternate path from the candidate list. The Resource Class Affinity Attributes (Section 5.6.3) utilizes a constraint-based routing to compute an explicit path for a traffic trunk subject to resource class affinity constraints. The Adaptivity Attribute (Section 5.6.4) changes paths when more efficient paths become available through the re-optimization process. The Load Distribution Across Parallel Traffic Trunks (Section 5.6.5) distributes the load across multiple trunk paths, wherein a flexible means of load assignment to multiple parallel traffic trunks carry traffic between a pair of nodes is possible. All of these are, according to RFC 2702, part of the dynamic path management.

50. Among the significant difference of the above listed dynamic path management methods in RFC 2702, some have a prespecified LSP or LSPs (e.g., Administratively Specified Explicit Paths, Hierarchy of Preference Rules for Multi-Paths, and Load Distribution Across Parallel Traffic Trunks) and some must establish a new LSP or LSPs (Resource Class Affinity Attributes, Adaptivity Attribute). Again, according to RFC 2702, they are all part of dynamic path management.

51. Of note, while RFC 2702 explains a number of dynamically managing paths, it does not discuss the LDP in any context, let alone the role of LDP in dynamically determining a specific LSP.

52. In light of what was known to one of ordinary skill in the art at the time of alleged invention of the '056 Patent (e.g., RFC 5036, RFC 3036, RFC 2702), one of ordinary skill in the art would not have known what the claim term “dynamically determined” by the LDP means. This is because the changes in the LSPs tunneling packets through the MPLS network can be one of many options described above, which are vastly different in scopes and methods, and the patent does not indicate which one, if any, of them to use. Since RFC 5036, RFC 3036, the IETF standards cited in the '056 patent and in the Nettles Declaration do not use the term “dynamically,” and RFC 2702 does not use the term “LDP,” the meaning of the claim term “dynamically determined” recited in claims 1, 18, 21 of the '056 Patent is even more confusing to one of ordinary skill in the art. *See* Dkt. 37 Exs. 3, 4 (IETF documents submitted alongside and described in the Nettles Declaration that have no mention of “dynamically”); *see also* Dkt. 37 Ex. 5 at 10 (Nettles Declaration citing to two IETF documents).

## IX. CONCLUSION

53. As explained above, I have concluded that the claim term “dynamically determined” in the context of claims 1, 18, and 21 of the ’056 Patent is indefinite.

54. At the time this declaration is written, I have not yet prepared any charts, slides, or presentation materials that summarize my opinions stated in this declaration. For any deposition or trial, I may prepare and use certain charts, slides, or presentation materials that summarize the materials that I have relied on to form my opinions set forth in this declaration and the contents of this declaration itself.

I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct.

Executed on March 22, 2021 in St. Louis, Missouri.



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Paul S. Min, Ph.D.

## **Appendix A – Paul Min Curriculum Vitae**

Paul S. Min, Ph.D.  
Washington University in Saint Louis  
(Webpage : <https://ese.wustl.edu/faculty/Pages/Paul-Min.aspx>)

[psm@wustl.edu](mailto:psm@wustl.edu)  
+1 (314) 853-6200 (phone)

Campus Box 1223  
Academy Building Room 218A  
St. Louis, MO 63130

### **Education**

<u>Year</u>	<u>College or University</u>	<u>Degree</u>
1987	The University of Michigan	Ph.D. in Electrical Engineering
1984	The University of Michigan	M.S. in Electrical Engineering
1982	The University of Michigan	B.S. in Electrical Engineering

### **Professional Experience**

From: 1990  
To: Present  
Organization: Washington University, St. Louis

#### Summary:

2015 - Senior Professor - Department of Electrical Systems Engineering

2011 – 2014 Chair – Undergraduate Curriculum, Department of Electrical and Systems Engineering

2000 – 2002 Chair – Graduate Curriculum, Department of Electrical and Systems Engineering

2002 - 2014

1997 - 2008	Associate Professor - Department of Electrical and Systems Engineering
1996 - 2002	On leave from full-time duty at Washington University – as Presidents of MinMax Technologies and Erlang Technology.)
1996	Associate Professor - Department of Electrical Engineering
1990 - 1996	Promoted with Tenure
Teaching Experience	Assistant Professor - Department of Electrical Engineering
<ul style="list-style-type: none"> <li>■ “Transmission System and Multiplexing,” Washington University, ESE 571</li> <li>■ “Electrical Laboratory I,” Washington University, EE 250.</li> <li>■ “Communication Theory,” Washington University, ESE 471.</li> <li>■ “Reliability and Quality Control,” Washington University, ESE 405/505</li> <li>■ “Signaling and Control of Communications Networks,” Washington University, ESE 572.</li> <li>■ “Introduction to Electronic Circuits,” Washington University, ESE232</li> <li>■ “Queueing Systems and Discrete Stochastic Processes,” Washington University, EE 536 / CS 567.</li> <li>■ “Digital Computer,” Washington University, EE 260M / CS 260.</li> <li>■ “Data Networks,” Washington University, EE 530.</li> <li>■ “Electrical Circuit Analysis,” Washington University, ESE 230.</li> <li>■ “Computer/Communications System Analysis I,” Washington University, EE 557/ CS 557.</li> <li>■ “Computer/Communications System Analysis II,” Washington University, EE558 / CS 558.</li> <li>■ “Digital Systems Laboratory,” Washington University, EE 455 / CS 455.</li> </ul>	

From: 1999  
 To: 2008  
 Organization: Erlang Technology, Inc., St. Louis, Missouri  
 Title: Founder and President  
 Summary: Up to 70 employees, \$40M in total capital raised from 5 VCs and 3 Corporations

Received “Product of Year” Award from Analog Zone Magazine in 2004

From: 1997  
To: 1999  
Organization: MinMax Technologies, Inc., St. Louis, Missouri  
Title: Founder and President  
Summary: Fabless semiconductor company, designing high performance switching ASICs

From: September 1987  
To: August 1990  
Organization: Bellcore, New Jersey  
Title: Member of Technical Staff  
Summary: Member of New Network Architecture Development Group

From: 1983  
To: 1987  
Organization: Department of Electrical Engineering, The University of Michigan  
Title: Graduate Instructor  
Summary: Instructor for senior level Electrical Engineering Laboratory Class.  
Received a Best “Best Graduate Instructor Award” from the Department of Electrical Engineering

### Professional Affiliations, Achievements & Awards

- Technical Program Committee, COMCAS 2019, Tel Aviv, November 2021.
- Technical Program Committee, COMCAS 2019, Tel Aviv, November 2019.
- Technical Program Committee, COMCAS 2017, Tel Aviv, November 2017.
- Technical Program Committee, COMCAS 2015, Tel Aviv, October 2015.
- Past-Chair, Saint Louis Section of the Institute of Electrical and Electronics Engineers (IEEE), 2015.
- Member of Executive Committee, Saint Louis Section of the IEEE, 2010-2015.
- Chair, Saint Louis Section of the IEEE, 2014.
- Technical Program Committee, COMCAS 2013, Tel Aviv, October 2013.
- Vice Chair, Saint Louis Section of the IEEE, 2013

- Treasurer, Saint Louis Section of the IEEE, 2012.
- The Best Paper Award at MOBILITY 2011, October 2011, Barcelona, Spain.
- Counselor, Student Chapter of the Year, the Institute of Electrical and Electronics Engineers, 2011.
- Award of Appreciation, Saint Louis Section of the Institute of Electrical and Electronics Engineers, 2011, for contribution to various activities of the Saint Louis Section the Institute of Electrical and Electronics Engineers.
- Secretary, Saint Louis Section of the IEEE, 2010.
- Counselor, Student Chapter of the Year, the Institute of Electrical and Electronics Engineers, 2010.
- Wall Street Journal Businessmen of Year, 2003.
- American Men and Women of Science, listed in 1997.
- Member, Eta Kappa Nu (Honor Society for Electrical Engineers), inducted in 1992
- Outstanding Achievement Award, Bellcore, 1990.
- 18th ISATA Award of Technical Excellence, the best paper award at ISATA 1988.
- Rockwell Fellow, Rockwell International, 1985, 1986.
- Outstanding Graduate Student Award, the University of Michigan, 1985.
- Outstanding Teaching Award, the University of Michigan, 1984, 1986.
- Member of Honor's College, the University of Michigan, 1979, 1980.
- Honor's Convocation, the University of Michigan, 1979.
- Outstanding Freshman Award, the University of Michigan, 1979.
- Woodhaven Rotary Club Scholarship, Woodhaven Rotary Club, 1978.
- Second Place Winner, the State of Michigan Mathematics Prize Competition, 1977.
- International Program Committee, *IASTED International Conference on Communications, Internet and Information Technology (CIIT 2005)*, Cambridge, Massachusetts from October 31-November 2, 2005.
- International Program Committee, *IASTED International Conference on Communications 2003*, Scottsdale, Arizona, 2003.
- International Program Committee, *Wireless and Optical Communications 2003*, Banff, Canada, 2003.
- International Program Committee, Session Chair, *Wireless and Optical Communications 2002*, Banff, Canada, 2002.

- Invited participant, *NSF Workshop on Enhancing International Cooperation in CS/CE Research and Education*, Portland, 1997.
- Session Chair, *the 1993 Conference on Information Sciences and Systems*, Baltimore, March 1997.
- Member, Board of Editors, *Journal of Network and Systems Management*, 1996-1998.
- Program Committee, *International Symposium on Integrated Network Management*, San Diego, 1997.
- Guest Editor, *Journal of Network and Systems Management, Special Issue on Routing in Broadband Networks*, December 1995 and June 1996.
- Invited participant, *ARPA Workshop on Survivability of Large Scale Systems*, Washington D.C., 1996.
- Special Event Organizer, *International Symposium on Integrated Network Management*, Santa Barbara, 1995.
- Organizing Committee, *International Symposium on Integrated Network Management*, Santa Barbara, 1995.
- Local Arrangements Chair, *IEEE Information Theory Workshop on Information Theory Multiple Access and Queueing*, St. Louis, 1995.
- Chair, *Communications Chapter, St. Louis Section of the IEEE*, 1995.
- Participant, *IEEE Information Theory Workshop on Information Theory, Multiple Access and Queueing*, St. Louis, 1995.
- Participant, *ARPA/AFOSR Non-Linear Optics and Communication Workshop*, Denver, 1994.
- Participant, *CNRI Giga Bit Network Workshop*, Washington D.C., 1993.
- Participant, *IFIP/IEEE International Workshop on Distributed Systems*, New Jersey, 1993.
- Program Committee, *International Conference on Computer Communications and Networks*, San Diego, 1992.
- Session Chair, *ISMM International Conference*, New Orleans, 1990.
- Senior Member, *IEEE*.
- Member, *IEEE Committee on Network Operations and Management*.
- Member, *IEEE Committee on Computer Communications*.
- Registered Specialist, *Hong Kong Research Grant Council*.
- Reviewer, *IEEE Transactions on Communications*.
- Reviewer, *IEEE Transactions on Networking*.
- Reviewer, *IEEE Journal on Selected Areas in Communications*.
- Reviewer, *Journal of Network and Systems Management*.
- Reviewer, *Telecommunication Systems*.
- Reviewer, *Computers and Electrical Engineering*.
- Reviewer, *ETRI Journal*.
- Reviewer, *IEEE Transactions on Automatic Control*.

- Reviewer, *IEEE Communications*.
- Book Reviewer, *Prentice Hall*.
- Book Reviewer, *Morgan Kaufmann Publishers, Inc.*
- Book Reviewer, *Irwin Publishing Co.*

### **University Activities:**

- Undergraduate Studies Committee, School of Engineering and Applied Science (2012 – Present)
- Faculty Advisor for IEEE Student Chapter (2009 – Present)
- Ambassador for McDonnell International Scholar Academy (2007 – 2013)
- Web Development Committee (2006 – 2008)
- University Judicial Board (1998 - 2000)
- Resource Generation Committee (1994 - 1995)
- Top 20 Committee (1992 - 1995)
- Telecommunications Committee, Chair (1991 - 1997)
- Library Planning Committee (1991 - 1992)
- Computer Engineering Committee (1990 - 1996)
- Communications Curriculum Committee (1990 - 1992)
- Resources Committee (1990 - 1992)

### **Patents**

<u>Patent No.</u>	<u>Date</u>	<u>Title</u>
10,623,323	04/14/20	Network Devices and a Method for Signature Pattern
10,284,476	05/07/19	Detection Hierarchical Pattern Matching Devices and Methods
7,110,411	09/19/06	Method of and Apparatus for WFQ Scheduling Using a Plurality of Scheduling Queues to Provide Fairness, High Scalability, and Low Computational Complexity
7,106,738	09/12/06	Method of and Apparatus for High Speed Packet Switching Using Train Packet Queuing and Providing High Scalability
6,859,455	02/22/05	Method of and Apparatus for Building and Using Multi-Dimensional Index Trees for Multi-Dimensional Data Objects

6,614,789	09/02/03	Method of and Apparatus for Matching Strings of Different Lengths
6,359,885	3/19/02	Multi-Channel Packet Switching Apparatus Having Traffic Flow Controlling and Checking Functions
6,128,292	10/03/00	Packet Switching Apparatus with Multi-Channel and Multi-Cast Switching Functions and Packet Switching System Using the Same
5,788,161	12/13/98	Network Designer for Communication Networks
5,526,352	06/11/95	Integrable Low Complexity Multi-Channel Switch
5,440,549	08/08/95	Nonblocking Multi-Channel Switching with Multicasting Capability

## Publications

- Yu, Qixiang, Luo, Z, and Min, P.S., “Intrusion Detection in Wireless Sensor Networks for Destructive Intruders.” Proceedings of the APSIPA 2015 conference. December 16-19, 2015.
- Hung, C.P., and Min, P.S., “Simple Web Application Framework.” Submitted for publication in the IEEE Transactions on Cloud Computing.
- Luo, Z., and Min, P.S., “Parallel Implementation of Energy-Based Target Localization Methods in Wireless Sensor Networks.” Proceeding of the 2014 IEEE SOUTHEASTCON.
- Yu, Q., Luo, Z., and Min, P.S., “Intrusion Detection in Wireless Sensor Networks for Destructive Intruder.” Proceeding of 2014 International Conference on Smart Computing (SMARTCOMP 2014).
- Luo, Z., and Min, P.S., “Survey of Target Localization Methods in Wireless Sensor Networks,” 19th IEEE International Conference on Networks (ICON 2013), Singapore, December 11-13, 2013.
- Hung, C.P., and Min, P.S., “Deriving and Visualizing the Lower Bounds of Information Gain for Prefetch Systems,” 19th IEEE International Conference On Networks (ICON 2013), Singapore, December 11-13, 2013.
- Hung, C.P., and Min, P.S., “Access LUT without CAM - Improved Pearson Hashing for Collision Reduction,” 19th IEEE International Conference On Networks (ICON 2013), Singapore, December 11-13, 2013.
- Luo, Z and Min, P.S., “Target Localization in Wireless Sensor Networks for Industrial Control with Selected Sensors.” International Journal of Distributed Sensor Networks, Volume 2013 (2013), Article ID 304631.

- Hung, C.P., and Min, P.S. “Performance Evaluation of Distributed Mobile Application Virtualization Services,” International Journal on Advances in Internet Technology, Vol. 5, no. 3&4, 2012, pp. 65-83.
- Hung, C.P. and Min, P.S., “Performance evaluation of distributed application virtualization services using the UMTS mobility model,” MOBILITY 2011 The First International Conference on Mobile Services, Resources, and Users, 23-29 Oct. 2011.
- Hung, C.P. and Min, P.S., “Service Area Optimization For Application Virtualization Using UMTS Mobility Model,” International Conference on Internet Computing, pp. 128-134, Las Vegas, July 18-21, 2011.
- Hung, C.P. and Min, P.S., “Application Virtualization Using UMTS Mobility Model,” ICOMP’11, September, 2011.
- Hung, C.P. and Min, P.S., “Infrastructure Arrangement for Application Virtualization Service,” the 9th International Information and Telecommunication Technologies Symposium, Vol.1, pp. 78-85, Rio de Janeiro, December 2010.
- Hung, C.P. and Min, P.S., “Probabilistic Approach to Network-Based Virtual Computing,” the 9th International Information and Telecommunication Technologies Symposium, Vol.1, pp. 117-124, Rio de Janeiro, December 2010.
- Shiravi, A. and Min, P. S., “On the Latency Bound of Proportional Nested-DRR with Credit Adjusting,” *2007 Workshop on High Performance Switching and Routing HPSR 2007*, July 2007.
- Shiravi, A. and Min, P. S., “LOOFA-PB: A Modified LOOFA Scheduler for Variable-Length Packet Switching.” *2007 IEEE International Conference on Communications (ICC 2007)*, Glasgow, June 2007.
- Shiravi, A., Kim, Y. G., and Min, P. S., “Congestion Prediction of Self-Similar Network through Parameter Estimation,” *Proceedings of 2006 IEEE/IFIP Network Operations & Management Symposium*, April 2006, Vancouver.
- Shiravi, A., Kim, Y. G., and Min, P. S., “Traffic Dispatching Algorithm in Three-Stage Switch,” *Proceedings of 5th International Conference on Networking*, April 2006, Mauritius.
- Shiravi, A., Kim, Y. G., and Min, P. S., “Proportional Nested Deficit Round Robin with Credit Adjusting,” *Proceedings of 2nd Int'l Conf. on Quality of Service in Heterogeneous Wired/Wireless Networks (QShine 2005)*, Orlando, August 2005.
- Shiravi, A., Kim, Y. G., and Min, P. S., “Proportional Nested Deficit Round Robin: Improving the Latency of Packet Scheduler with an O(1) Complexity,” *Proceedings of International Workshop on Advanced*

*Architectures and Algorithms for Internet Delivery and Applications (AAA-IDEA 2005), Orlando, June 2005*

- Kim, Y. G., Shiravi, A., and Min, P. S., “Prediction-Based Routing through Least Cost Delay Constraint,” *Proceedings of IEEE IPDPS 2004*, Santa Fe, April 2004.
- Kim, Y. G. and Min, P. S., “On the Prediction of Average Queuing Delay with Self-Similar Traffic,” *Proceedings of IEEE GLOBECOM 2003*, San Francisco, December 2003.
- Hu, C., Saidi, H., Yan, P. Y., and Min, P.S., “A Protocol Independent Policer And Shaper Using Virtual Scheduling Algorithm,” *Proceedings of ICCAS 2002*.
- Hu, C., Saidi, H., and Min, P.S., “DB\_WFQ: An Efficient Fair Queueing Using Binary Counter,” *Proceeding of Coins 2002*.
- Yoon, U. and Min, P.S., “Performance Analysis of Radio Link Control Mechanism in W-CDMA System”, IEEE VTC’01 Fall, October 2001, New Jersey
- Akl, B., Hegde, M.V., Naraghi-Pour, M., and Min, P.S., “Multi-Cell CDMA Network Design,” *IEEE Transaction on Vehicular Technology*, Volume 50, No. 3, pp. 711-722, May 2001.
- Yoon, U., Park, S., Min, P.S., “Performance Analysis of Multiple Rejects ARQ at RLC (Radio Link Control) for Packet Data Service in W-CDMA System,” *IEEE Globecom*, November 2000, San Francisco.
- Yoon, U., Park, S., Min, P.S., “Performance Analysis of Multiple Rejects ARQ for RLC (Radio Link Control) in the Third Generation Wireless Communication,” *WCNC*, September 2000, Chicago.
- Yoon, U., Park, S., Min, P.S., “Network Architecture and Wireless Data Service Protocol based on Mobile IP toward the Third Generation Wireless Communication,” *3G Wireless*, June 2000, San Francisco, pp. 211-215
- R.G. Akl, M.V. Hegde, M. Naraghi-Pour, P.S. Min, “Multi-Cell CDMA Network Design,” *IEEE International Conference on Communications*, June 2000.
- R.G. Akl, M.V. Hegde, M. Naraghi-Pour, P.S. Min, “CDMA Network Design to Meet Non-uniform User Demand,” *International Teletraffic Congress*, March 2000.
- R.G. Akl, M.V. Hegde, M. Naraghi-Pour, P.S. Min, “CDMA Network Design,” *IEEE Transactions on Vehicular Technology*.
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- Akl, B.G., Hegde, M.V., and Min, P.S., “Effects of Mobility on Network Throughput in Multicell CDMA Networks,” accepted, *International Conference on Communications*, June 1999.
- Akl, B.G., Hegde, M.V., Min, P.S., and Naraghi-Pour, M., “Flexible Allocation of Capacity in Multi-Cell CDMA Networks,” accepted, *Vehicular Technology Conference*, June 1999.
- R.G. Akl, M.V. Hegde, M. Naraghi-Pour, P.S. Min, “Flexible Allocation of Capacity in Multi-Cell CDMA Networks,” *IEEE Vehicular Technology Conference*, May 1999, Volume 2, pp. 1643-1647.
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- Shin, S.W., Min, P.S., and Kim, J.H., “Real Time Traffic Management System at Korean Mobile Telecom,” *Proceedings of 19th Annual Pacific Telecommunications Conference*, pp. 113-121, Honolulu, Hawaii, January 1997.

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- Min, P.S., Hegde, M.V., and Rayes, A., “Real Time Traffic Estimation in Circuit-Switched Networks,” *Proceedings of the 14<sup>th</sup> International Teletraffic Congress*, France, pp. 1175-1184, June 1994.
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- Saidi, H., Min, P.S., and Hegde, M.V., “Nonblocking Multi-Channel Switching in ATM Networks,” *Proceedings of the 1994 International Conference on Communications*, New Orleans, pp. 701-705, May 1994.
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- Rayes, A. and Min, P.S., "Capacity Expansion in State Dependent Routing Schemes," *Proceedings of the 1994 Conference on Information Sciences and Systems*, Princeton, pp. 237-241, March 1994.
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- Saidi, H., Min, P.S., and Hegde, M.V., "Non-Blocking Multi-Channel Switching." Invited paper. *Proceedings of the 31st Annual Allerton Conference*, pp. 335-344, September 1993.
- Min, P.S., Hegde, M.V., and Rayes, A., "Model Based Estimation of Exogenous Traffic," *Proceedings of the 1993 Conference on Information Sciences and Systems*, Baltimore, pp. 126-131, March 1993.
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- Min, P.S., "Validation of Controller Inputs in Electronically Controlled Engines." Invited paper. *Proceedings of the 1990 American Control Conference*, pp. 2887-2890, San Diego, May 1990.
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### Testimony Provided or Expected to Provide as Expert Witness

Matter: Patent Infringement for Fiber Optic Devices

Law Firm: Cooley

Case Name: Certain High-Density Fiber Optic Equipment and Components  
Thereof, U.S.I.T.C. Inv. No. 337-TA-1194

Testifying Expert for AFL Communications, Panduit, FS.Com,  
Wirewerk, and Siemon

Completed in October 2020.

(Expert reports submitted, deposed, and testified during trial.)

Matter: Patent Infringement for Optical Transport Networks

Law Firm: Venerable

Case Name: Huawei Technologies Co. Ltd v Verizon Communications, Inc., et. al., 2:20-cv-0030

Testifying Expert for Verizon.

Retained in March 2020.

(IPR declarations submitted.)

Matter: Patent Infringement for Wireless Communication

Law Firm: McDermott Will & Emery

Case Name: Bell Northern Research LLC v. ZTE. (Case No. 3:18-cv-01786 - S.D. Cal)

Testifying Expert for ZTE.

Retained in July 2019.

(IPR declarations submitted.)

Matter: Patent Infringement for Wireless Communication  
Law Firm: Jones Day  
Case Name: Bell Northern Research LLC v. Kyocera Corp. (Case No. 3:18-cv-1785 - S.D. Cal)  
Testifying Expert for Kyocera.  
Completed in May 2019.  
(Claim construction declaration submitted, and deposed.)

Matter: Patent Infringement for Electronic Payment Systems  
Law Firm: Paul Hastings  
Case Name: ID Tech Corp. v. Samsung Electronics Co., Ltd., et al. (Case No. No. 8:17-cv-1748-DOC-JDE (C.D. Cal))  
Testifying Expert for Samsung.  
Retained in January 2019.  
(Expert reports submitted, and deposed.)

Matter: Patent Infringement for Internet Switching  
Law Firm: Maynard Cooper  
Case Name: Parity Networks, LLC v. Juniper Networks, Inc., Case No. 6:17-CV-00495-RWS-KNM (U.S.D.C.E.D. Tx.)  
Testifying Expert for Juniper.  
Retained in April 2018.  
(IPR declarations submitted.)

Matter: Patent Infringement for Internet Switching  
Law Firm: Morgan Lewis  
Case Name: Parity Networks, LLC v. Hewlett Packard Enterprise Company, Case No. 6:17-CV-00682 (U.S.D.C.E.D. Tx.)  
Testifying Expert for Hewlett Packard Enterprise Company.  
Retained in September 2018.  
(IPR declarations submitted.)

Matter: Inter Parte Rexamination for Covered Business Method  
Law Firm: Reed Smith LLP  
Case Name: NASDAQ v. Miami International  
Expert for Miami International.  
Retained in February 2018.

(Expert declarations submitted, and deposed.)

Matter: Patent Infringement for Mobile Devices

Law Firm: Quinn Emanuel

Case Name: Qualcomm v. Apple, Case No. 3:17-cv-00108-GPC-MDD  
(U.S.D.C.S.D. Cal.)

Testifying Expert for Qualcomm.

Completed in April 2019.

(Expert reports submitted, and deposed.)

Matter: Patent Infringement for Communication Devices

Law Firm: Venable

Case Name: Sycamore IP Holdings LLC v. Verizon Communications Inc, Case  
No. 2:16-cv-591-JRG-RSP (U.S.D.C. E.D. Texas)

Testifying Expert for Verizon and Level 3.

Completed in September 2017.

(Expert reports submitted, and deposed.)

Matter: Patent Infringement for Mobile Devices

Law Firm: Alston Bird

Case Name: Huawei Technologies Co. Ltd. V. Nokia Solutions and Networks,  
Case No. 2:16-cv-0056-JRG-RSP (U.S.D.C. E.D. Texas)

Testifying Expert for Nokia.

Completed in December 2017.

(Expert reports submitted.)

Matter: Patent Infringement for Mobile Devices

Law Firm: Quinn Emanuel

Case Name: Huawei Technologies Co. Ltd. V. Samsung Electronics C. Ltd, Case  
No. 3:16-cv-02787 (U.S.D.C. N.D. Cal)

Testifying Expert for Samsung.

Completed in March 2019.

(Expert reports submitted, and deposed.)

Matter: Arbitration for Licensing

Law Firm: Alston Bird

Case Name: Nokia v. LG Electronics, International Chamber of Commerce Arb.  
No. 21326

Testifying Expert for Nokia.

Completed in October 2016.  
(Expert reports submitted.)

Matter: Patent Infringement for Mobile Devices  
Law Firm: Ropes and Gray  
Case Name: Godo Kaisha IP Bridge 1 v. TCL Communication Technology Holdings, Case No. 15-634-SLR-SRF (U.S.D.C.S.D. Delaware.)  
Testifying Expert for IP Bridge.  
Completed in October 2018.  
(Expert reports submitted, and deposed.)

Matter: Patent Infringement for Mobile Devices  
Law Firm: Paul Hastings  
Case Name: Odyssey Wireless, Inc., v. Samsung Electronics Co., Ltd., et al, Case No. 3:15-cv-1738-H-RBB (U.S.D.C.S.D. Cal.)  
Testifying Expert for Samsung.  
Completed in October 2016.  
(Expert reports submitted.)

Matter: Patent Infringement for Mobile Devices  
Law Firm: Greenberg Traurig  
Case Name: Mobile Telecommunications Technologies LLC v. Amazon.com, Inc., 2:13-cv-883-JRG-RSP (U.S.D.C. E.D. Texas)  
Testifying Expert for Amazon.  
Completed in April 2015.  
(Expert reports submitted, and deposed.)

Matter: Patent Infringement for Mobile Devices  
Law Firm: Mayer Brown  
Case Name: Mobile Telecommunications Technologies LLC v. LG Electronics Mobilecomm U.S.A., Inc., 2:13-cv-947-JRG-RSP (U.S.D.C. E.D. Texas)  
Testifying Expert for LG Electronics Mobilecomm.  
Completed in February 2016.  
(Expert reports submitted, and deposed.)

Matter: Patent Infringement for Semiconductor Devices  
Law Firm: Mayer Brown  
Case Name: Inter Parte Reexamination for U.S. Patent Nos. 6,895,520 and 6,899,332  
Expert for LG Electronics.  
Completed in February 2016.  
(Expert declaration submitted, and deposed.)

Matter: Patent Infringement in Vehicular Electronics  
Law Firm: Gardner, Linn, Burkhart & Flory, L.L.P  
Case Name: *Magna Electronics Inc. v. TRW Automotive Holdings Corp. et al.*, Civil Action No. 1:12-cv-00654 (Western District of Michigan), and relating to the action styled *Magna Electronics Inc. v. TRW Automotive Holdings Corp. et al.*, Civil Action No. 1:13-cv-00324 (Western District of Michigan).  
Testifying Expert for Magna Electronics  
Completed in February 2016.  
(Expert reports submitted, and deposed.)

Matter: Patent Infringement in Electronic Circuits  
Law Firm: Ropes and Gray  
Case Name: Certain Devices Containing Non-Volatile Memory and Products Containing the Same (USITC Inv. Nos. 337-TA-922)  
Testifying Expert for Spansion Inc.  
Completed in February 2015.  
(Expert reports submitted.)

Matter: Trade Secret Misappropriation in Software Method for Cable Television Advertisement  
Law Firm: Brownstein Hyatt Farber Schreck  
Case Name: Cross MediaWorks v. EMT Holdings, USDC Southern District of New York, Case No. 1:14-cv-00561-VSB  
Testifying Expert for Cross MediaWorks.  
Completed in April 2015.  
(Testified during injunction hearing.)

Matter: Patent Infringement in Vehicular Electronics  
Law Firm: Steptoe and Johnson

Case Name: Certain Vision-Based river Assistance System Cameras and Components Thereof (USITC Inv. Nos. 337-TA-899 and 907)  
Testifying Expert for Magna Electronics  
Completed in February 2015.  
(Expert reports submitted, deposed, and testified during trial.)

Matter: Patent Infringement for Vehicular System  
Law Firm: Susman Godfrey  
Case Name: Eagle Harbor Holdings, LLC, and Mediustech, LLC, v. Ford Motor Company, 3:11-cv-05503-BHS (U.S.D.C. Western District of Washington at Tacoma)  
Testifying Expert for Mediustech.  
Completed in March 2015.  
(Expert reports submitted, deposed, and testified during trial.)

Matter: Patent Infringement for Communication Networks  
Law Firm: Davis Polk & Wardwell LLP  
Case Name: Sprint Communications Company L.P., v. Comcast Cable Communications, LLC, Comcast IP Phone, LLC, and Comcast Phone of Kansas, LLC. 2:11-cv-02684-KHV-DJW (U.S.D.C. Kansas)  
Testifying Expert for Comcast.  
Retained in March 2012.  
(Expert reports submitted, and deposed.)

Matter: Patent Infringement for Communication Networks  
Law Firm: Quinn Emanuel  
Case Name: France Telecom S.A. v. Marvell Semiconductor, Inc., 12-Civ-4986 (S.D.N.Y.)  
Testifying Expert for Marvell.  
Completed in September 2014.  
(Expert reports submitted, deposed, and testified during trial.)

Matter: Wireless Image Distribution  
Law Firm: Jones Day  
Case Name: *Inter Partes* Review of U.S. Patent No. 8,437,797  
Expert for Google Inc.  
Completed in November 2014.  
(Expert declaration submitted.)

Matter: Nonvolatile Semiconductor Memories

Law Firm: Jones Day

Case Name: *Inter Partes* Review of U.S. Patent Nos. 8,301,833 and 8,516,187

Expert for SanDisk.

Completed in May 2014.

(Expert declaration submitted.)

Matter: Communication Protocols for Wireless Device

Law Firm: Dorsey & Whitney, LLP

Case Name: Certain Point-To-Point Network Communication Devices and

Products Containing Same (USITC Inv. No. 337-TA-892)

Testifying Expert for Toshiba

Completed in May 2014.

(Expert reports submitted, and deposed.)

Matter: Patent Infringement for Wireless Networks

Law Firm: Ropes and Gray

Case Name: In the Matter of Certain Wireless Devices With 3G and/or 4G

Capabilities and Components Thereof (USITC Inv. No. 337-TA-868)

InterDigital Comms., Inc. v. Huawei Techs. Co., Ltd., No. 13-00008

(D. Del., filed January 2, 2013), InterDigital Comms., Inc. v. ZTE

Corp., No. 13-00009 (D. Del., filed January 2, 2013), InterDigital

Comms., Inc. v. Nokia Corp., No. 1:13-cv-00010 (D. Del., filed

January 2, 2013), InterDigital Comms., Inc. v. Samsung Elec. Co.,

Ltd., No. 13-00011 (D. Del., filed January 2, 2013)

Testifying Expert for Joint Defense Group.

Completed in February 2014.

(Expert reports submitted, deposed, and testified during trials.)

Matter: Patent Infringement for Mobile Communication

Law Firm: Finnegan, Henderson, Farabow, Garrett & Dunner, L.L.P.

Case Name: Certain Digital Media Devices, Including Televisions, Blu-Ray Disc

Players, Home Theater Systems, Tablets and Mobile Phones,

Components Thereof and Associated Software (USITC Inv. No. 337-

TA-882)

Testifying Expert for LG Electronics, Inc.

Completed in February 2014.

(Expert reports submitted, deposed, and testified during trial.)

Matter: Patent Infringement for Wireless Networks

Law Firm: Vinson & Elkins LLP

Case Name: Wi-LAN USA, Inc. and Wi-LAN, Inc. v. Telefonaktiebolaget LM Ericsson and Ericsson, Inc. (USDC: Southern District of FL - Case #1: 12-cv-23569), Wi-LAN USA, Inc. and Wi-LAN, Inc. v. Alcatel-Lucent USA, Inc. (USDC: Southern District of FL - Case #1: 12-cv-23568-Altonaga/Simonton)  
Testifying Expert for Wi-LAN.  
Completed in May 2015.  
(Expert reports submitted, and deposed.)

Matter: Patent Infringement for Data Storage

Law Firm: Ropes and Gray, Weil Gotshal

Case Name: Summit Data Systems, LLC v. EMC Corporation., et al. 1:10-cv-00749-GMS (U.S.D.C. Delaware)  
Testifying Expert for EMC Corporation and Netapp, Inc.  
Completed in December 2012.  
(Expert reports submitted, and deposed.)

Matter: Patent Infringement for Wireless Mobile Device

Law Firm: Ashurst Australia

Case Name: Samsung v. Apple, Australian Federal Court Proceeding No. NSD 1243 of 2011

Testifying Expert for Samsung Electronics.

Completed in December 2012.

(Expert reports submitted, deposed, and testified during trial.)

Matter: Patent Infringement for Wireless Mobile Devices

Law Firm: Quinn Emanuel

Case Name: Apple Inc. v. Samsung Electronics Co., Ltd., et al., 4:11-cv-01846-LHK (N.D. Cal.) and Samsung Electronics Co., Ltd., et al. v. Apple Inc., 4:11-cv-02079 (N.D. Cal.)

Testifying Expert for Samsung Electronics.

Completed in July 2012.

(Expert reports submitted, and deposed.)

Matter: Patent Infringement for Wireless Mobile Device

Law Firm: Quinn Emanuel

Case Name: Certain Electronic Devices, Including Wireless Communication Devices, Portable Music And Data Processing Devices, And Tablet Computer, U.S.I.T.C. Inv. No. 337-TA-794

Testifying Expert for Samsung Electronics.  
Completed in June 2012.  
(Expert reports submitted, deposed, and testified during trial.)

Matter: Patent Infringement for Portable Storage Device  
Law Firm: White and Case  
Case Name: CERTAIN UNIVERSAL SERIAL BUS (“USB”) PORTABLE  
STORAGE DEVICES, INCLUDING USB FLASH DRIVES AND  
COMPONENTS THEREOF, US International Trade Commission  
Investigation No. 337-TA-788  
Testifying Expert Witness for Trek  
Completed in May 2012.  
(Expert reports submitted, and deposed.)

Matter: Copyright Infringement for Petroleum Processing Software  
Law Firm: Osha Liang LLP  
Case Name: Aspen Technology, Inc. v. Tekin A. Kunt and M3 Technology, Inc.,  
Case Number: H-10-1127, US District Court, Texas, Houston  
Division.  
Testifying Expert for M3 Technology, Inc.  
Completed in May 2012.  
(Expert reports submitted, deposed, and testified during trial.)

Matter: Trade Secret Misappropriation for DC-DC converter  
Law Firm: Covington & Burling, Haynes Boone  
Case Name: Certain DC—DC Controllers and Products Containing Same, US  
International Trade Commission Investigation No. 337-TA-698  
Testifying Expert for UPI.  
Completed in March 2012.  
(Expert reports submitted, deposed, and testified during trial.)

Matter: Patent Infringement for Parallel Processor  
Law Firm: Orrick, Herrington, & Sutcliffe. Kirkland and Ellis.  
Case Name: BIAX Corporation v. Nvidia and Sony Civil Action No. 09-cv-01257-  
PAB-MEH  
Testifying Expert for Nvidia and Sony  
Completed in March 2012.  
(Expert reports submitted, and deposed.)

Matter: Patent Infringement for Call Center Technology

Law Firms: Duffy, Sweeney, and Scott. Foley Lardner.

Case Name: Ronald Katz Technology Licensing v. Citizens Financial Group 7-ML-1816-C RGK (FFM)

Testifying Expert Witness for Citizens Financial Group.  
Completed in 2011.

(Expert reports submitted, and deposed.)

Matter: Patent Infringement for Storage Area Network

Law Firm: DLA Piper

Case Name: Network Appliance, Inc., v. Sun Microsystems, Inc., Case Number: C-07-06053 EDL, US District Court, Northern District of California, San Francisco Division.

Testifying Expert for Sun Microsystems, Inc.  
Completed in 2010.

(Expert reports submitted, and deposed.)

Matter: Patent Infringement for Flat Panel Display Controller

Law Firm: Jones Day

Case Name: Certain Video Displays, Components Thereof, and Products Containing Same, US International Trade Commission Investigation No. 337-TA-687

Testifying Expert for Vizio, Inc.  
Completed in 2010.

(Expert reports submitted, deposed, and testified during trial.)

Matter: Patent Infringement for Call Center Technology

Law Firms: Foley Lardner

Case Name: Ronald Katz Technology Licensing v. US Bank 7-ML-1816-C RGK (FFM)

Testifying Expert Witness for US Bank  
Completed in May 2009.  
(Expert reports submitted, and deposed.)

Matter: Patent Infringement for USB to VGA Converter

Law Firm: Wang Hartmann, Gibbs, & Cauley, P.C.

Case Name: Displaylink Corporation v. Magic Control Technology Corporation, Case No. 5:07-CV-01998-RMW, US District Court, Northern District of California, San Francisco Division.

Testifying Expert for Magic Control Technology Corporation  
Completed in 2009.

(Expert reports submitted, and deposed.)

Matter: Patent Infringement for Flash Memory

Law Firm: Jones Day and Wilson Sonsini

Case Name: Certain Flash Memory Controllers, Drives, Memory Card, and Media Players and Products Containing Same. US International Trade Commission Investigation No. 337-TA-619  
Testifying Expert for SanDisk Corporation.  
Completed in 2008.

(Expert reports submitted, deposed, and testified during trial.)

Matter: Patent Infringement for Semiconductor Packaging

Law Firm: Jones Day

Case Name: Certain Semiconductor Chips with Minimized Chip Package Size and Products Containing the Same. US International Trade Commission Investigation No. 337-TA-605  
Testifying Expert for Freescale Semiconductor  
Completed in 2008.

(Expert reports submitted, deposed, and testified during trial.)

Matter: Patent Infringement for Automatic Switching System

Law Firms: Jones Day, and Heller Ehrman, LLP.

Case Name: ATEN International Co., Ltd and ATEN Technology, Inc. v. Belkin Corporation, Belkin Logistics, Inc. and Emine Technology Co., Ltd. US International Trade Commission Investigation No. Ltd 337-TA-589

Testifying Expert for Belkin Corporation, Belkin Logistics, Inc., and Emine Technology Co., Ltd.

Completed in 2007.

(Expert reports submitted, deposed, and testified during trial.)

Matter: Patent Infringement for Dual Mode Communication

Law Firm: Wilmer Cutler Pickering Hale and Dorr, LLP

Case Name: Broadcom Corporation v. Qualcomm Incorporated SACV05-467-JVS (RNBx)

Testifying Expert Witness for Broadcom Corporation

Completed in 2007.

(Expert reports submitted, deposed, and testified during trial.)

## **Appendix B – List of Reviewed Materials**

- U.S. Patent No. 7,519,056 Managing Traffic in a Multiport Network Node Using Logical Ports (“the ‘056 Patent”) to Ishwar, et.al.
- File history of U.S. Patent No. 7,519,056
- Declaration of Scott Nettles, Ph.D., March 1, 2021
- LDP Specification, Request for Comments 5036, Internet Engineering Task Force Network Working Group, October 2007
- LDP Specification, Request for Comments 3036, Internet Engineering Task Force Network Working Group, January 2001
- Requirements for Traffic Engineering Over MPLS, RFC 2702, September 1999
- draft-martini-l2circuit-encap-mpls-09.txt
- draft-martini-l2circuit-encap-mpls-04